ROBERT PLOT: BRITAIN'S 'GENIAL FATHER OF COUNTY NATURAL HISTORIES'

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ROBERT PLOT (1640–1696) has deservedly been called the 'genial father of County Natural Histories in Britain' for his work in this field (1). Like his friend John Aubrey, Plot was interested in promoting useful knowledge, emphasizing how his own work would contribute 'to the great benefit of Trade, and advantage of the People' (2). Also like the famous Aubrey he was interested in the supernatural and therefore he included accounts of occult phenomena in his natural histories (3). His *Natural History of Oxfordshire,* published after a lengthy period when natural history was still experiencing some difficulty in firmly superseding the chorographic element in the field of regional study, was chiefly responsible for popularizing regional natural history. It was deliberately intended by its author to supplement the 'Civil and Geographicall Historys' which up to that time still managed to exert an influence on the field as a whole (4).

These 'Civil and Geographicall Historys' were generally called 'chorographies' by most of Plot's fellow virtuosi, a name originally derived from the Classical Greek art of chorography whose purpose, according to Ptolemy, was to treat the geography and history of a relatively small area of the Earth's surface. This genre was practiced by William Camden, John Leland and other sixteenth and early seventeenth-century men, who adapted it to their own particular purposes. Plot, however, was one of the first 'regional writers' to discard many of the methods and interests of the chorographers, preferring rather to scientifically investigate the natural history.

Robert Plot descended from a rather 'genteel family at Borden near to Sittingbourne in Kent', the only son of Robert Plot (5). Educated at the Free School at Wye, Kent, he matriculated at Magdalen Hall, Oxford, in July 1658, where he later became Vice-Principal and Tutor. He graduated B.A. in 1661, M.A. in 1664, and B.C.L. in 1671. About the year 1676 he left Magdalen and entered as a commoner at University College, where he resided until his marriage in 1690. A firm believer in Bacon's dictum that natural history 'is used either for the sake of the knowledge of the particular things which it contains, or as the primary material of philosophy and the stuff and subject-matter of true induction', Plot intended to make a personal survey of the whole of

England and Wales in order to compile their natural history (6). Plot recorded his intention of making such a tour in an interesting letter (*c.* 1673) to Dr John Fell, Dean of Christ Church. It is here that Plot proposed to follow the examples of William Camden and John Leland:

> As often as I have reflected on the very great and no less commendable Service done to the Common-Wealth of Learning at home, and the Reputation of the Nation abroad, first by the indefatigable Travels of John Leland, and upon his Foundation a Superstructure added by William Camden Clarentieulx, and others; and that notwithstanding their great Industry not only considerable Additions might be made to whatever they have touch'd on, but a fair new Building erected (altogether as much to the Honour of the Nation) out of Materials they made little or no use of: so often I have thought with my self, provided I be judg'd a fit Person, the Design agreeable, and the Encouragement proportionable, that I might also in some measure deserve of my Country, if I would reassume their Labours, and once more take a journey at least through England and Wales, to make a strict search, and give a faithful Account to such as shall encourage me of all such Things (worthy notice) which they have wholly pass'd by, or but imperfectly mention'd (7).

Besides building on the work of Leland and Camden, Plot mentions, in his letter to Fell, his intention of rectifying the defects he found in Sir Henry Spelman's 'Villare Anglicum' (8). This work was a gazetteer, according to its Preface (dated 31 October, 1687), 'made by the appointment of Sir Henry Spelman, out of Speed's Mappes' (9). He also hoped to add to Weever's *Ancient Funerall Monuments* information 'on is all the other Dioceses in the same manner as he [Weever] has done the Dioceses of Canterbury, Rochester, London and Norwich' (10). Thus Plot indicated that he believed that one of the concerns of an antiquary, or of a natural historian, was the examination of inscriptions and similar sources. Conceiving his enterprise as a serious scientific project, however, Plot held it to be a history of 'Natural Bodys, and manual Arts, found or practised within the Kingdom of England and Dominion of Wales' (11). In one sense, it may be said that in envisaging a series of county studies covering all the counties, he emulated Leland, Camden, and Norden, the major difference being that the content of Plot's volumes was primarily natural history rather than chorography. Plot sought a Royal Commission to travel through all parts of the country, similar to the one held by Leland. He also armed himself with the following testimonial, signed by the principal dignitaries of Oxford:

> These are to signifye to all whom it may concern that Robert Plott, Doctor of Laws, and now of Magdalen Hall in the University of Oxford, being studious to make search after the Rarities both of Nature and Arts afforded in the Kingdome for the Information of the Curious and in order to an Historical account of the same, by him promised hereof to be given, Wee whose Names are subscribed doe approve of that his ingenious undertaking and doe recommend him to the Courteous furtherance of such persons of whom he shall have occasion to make enquiry in the procedure of that Affair (12).

In his work Plot relied on printed sheets of queries such as those utilized a decade earlier by the Georgicall Committee in its survey of agriculture in different regions, which he supplemented with his own. It is little known that Plot put his name to two separate sets of these, both of which were even more systematic than those drafted by Ogilby (13).

Aubrey was one of the first to collaborate with Plot, sending him the results of all his years of collecting material on Surrey, Wiltshire, and several other shires (14). Plot quoted 'Mr Aubrey's notes' in his *Oxfordshire,* and Aubrey kept on providing additional information for years to come (15). For example, Aubrey transcribed and then forwarded to Plot in 1684 the notes that he had made on the flyleaves of his copy of *Oxfordshire* (16). It is unfortunate that Plot was apparently unwilling to fully acknowledge his debt to Aubrey. Despite his reference to 'Mr. Aubrey's notes', he generally downplayed Aubrey's role, as is evident in one of his letters to Aubrey, where he mentions finding 'many things . . . much to my purpose' in one of Aubrey's works, but adds that this did not apply to his study of Oxfordshire (17). This simply may have been, however, a natural reaction on the part of Plot to Aubrey's growing mistrust of the use of his (Aubrey's) materials by his colleagues. As Hunter indicates, Aubrey may also have been developing an intense pride in the value of his own work (18). It is also possible that Plot merely did not desire to make the extent of his debt—to a man floating on the fringes of Oxford's intellectual community—revealed to the whole world. Whatever the case, the example of Aubrey's work did in fact guide Plot to a considerable degree. This is especially true where *Oxfordshire* is concerned, since this book, begun in 1674, was intended as a demonstration of methods that Plot had hoped to apply to the entire country.

From Plot's notebooks one can gain a clear picture of exactly how he went about his self-appointed task. He commenced his fieldwork in the Parish of Cropredy and then, riding on horseback along the lanes or perambulating the fields on foot, he visited the northern parishes first. He next studied the

countryside between the rivers Evenlode and Thames during the summer of 1674, completing the fieldwork the following summer when he toured the western sector of Oxfordshire beyond the Evenlode and then the eastern sector beyond the Thames. In each case he used the rivers as dividers, portioning off the shire into five distinctive tracts. This method differed from that used by many of the chorographers in the past who, as we have seen, arranged their narratives so that they followed the rivers and described the places in sequence along them. Plot was only interested in the river system in so far as it marked off conveniently-sized portions of the county (19).

In the address which prefaced *Oxfordshire* Plot advised his readers that this work would aid in the 'advancement of a sort of Learning so much neglected in England [i.e., Nature or Arts],' and in the promotion of trade (20). Later in the book he claimed that in the account of the natural things of Oxfordshire he 'treated only of such as eminently . . . were some way or other useful to Man' (21). The opening address also contains a commentary on the county map which Plot had researched and drawn up. Its accuracy, he maintained, 'far exceeds any we had before', especially because 'it contains all the Mercat Towns, and many Parishes omitted by Saxton, Speed, etc.', and since 'it shews also the Villages, distinguished by a different mark and character, and the houses of the Nobility and Gentry, and others . . . and all these with their Bearings to one another, according to the Compass' (22). However, the map was 'not so perfect' because Plot could not provide distances that were 'Mathematically exact'. Yet he was confident that all his placings were fairly accurate. The system of house reference seems to have considerable priority on the map, perhaps so as to compensate for the usual disdain of the natural historian for mere genealogy. 'This Map is so contrived', he proudly pointed out, 'that a foreigner as well as English-man . . . may with ease find out who are the Owners of most of them . . . And all this done by Figures . . . placed in Order over the Arms in the limb of the Map'. He also saw the border of arms as not only useful as a reference to owners of houses depicted on the map, but as required ornament and as an 'Encouragement to the Gentry to keep their seats'.

It is certain from other features in the Legend that Plot intended this volume as a forerunner to a county series; the symbols for ancient ways, fortifications, and sites of religious houses were therefore designed to apply to 'all following maps as well as this'. A village, for Plot, consisted of an assembly of more than ten dwellings, 'Under which number I seldom think them worth notice'. Plot's rather aloof attitude is reflected in his plan for the incorporation of corrections. 'Gentry', he serves notice, were expected to bring details of

mistakes in the map directly to the Porter or one of the Keepers of the Bodleyan Library, who will be ready to receive them' (23).

Throughout his book Plot concentrated his attention on natural features or practical problems, so that there was no danger that he would become muddled in a matrix of genealogy and pedigrees. His method was to survey the county in each of its natural elements, thereby allowing the natural divisions to show up as a matter of course. Or, as he put it:

> I shall consider, first, Natural Things, such as . . . Animals, Plants, and the universal furniture of the World. Secondly, her [the county's] extravagancies and defects, occasioned either by the exuberancy of matter, or obstinacy of impediments, as in monsters. And then lastly, as she is restrained, forced, fashioned, or determined, by Artificial Operations. All which, without absurdity, may fall under the general notion of a Natural History, Things of Art (as the Lord Bacon well observeth) not differing from those of nature in form and essence, but in the efficient only; Man having no power over Nature, but in her matter and motion, i.e., to put together, separate, or fashion natural Bodies—and sometimes to alert their ordinary course.
>
> Yet neither shall I so strictly tie my self up to this method, but that I shall handle the two first, viz. The Several Species of natural things, and the errors of Nature in those respective species, together; and the things Artificial in the end apart; method equally begetting iterations and prolixity. where it is observed too much, as where not at all. And these I intend to deliver as succinctly as may be, in a plain, easie, unartificial stile. . . . (24)

This method, it will be observed, differed considerably from the short general description of a region by a chorographer, which usually prefaced a particular study of its hundreds of parishes, and which allowed the contrast between various kinds of land (or soils) to appear only by selection. The method he followed in *Oxfordshire* was the same he employed later in *The Natural History of Staffordshire* because, as these two books were to form part of a series, he adopted a consistent treatment from the start. The chapter headings are: I. 'Of the Heavens and Air'; II. 'Of the Waters'; III. 'Of the Earths'; IV. 'Of Stones'; V. 'Of Formed Stones'; VI. 'Of Plants'; VII. 'Of Brutes'; VIII. 'Of Men and Women'; IX. 'Of Arts' and X. 'Of Antiquities'. (Because of the close similarity of the two books, only one, *Staffordshire,* will be examined in any detail here).

The publication of *Oxfordshire* was enthusiastically greeted by the learned

gentlemen of the day, and facilitated Plot's entry into the Royal Society the same year. It was also among the Fellows of the Society that he circulated his enquiries. Even previous to this, however, he had been actively involved in the Society's intellectual orbit, engaging himself in the discussion of problems concerning husbandry, occasionally meeting Robert Hooke in the coffee houses of London, or contributing scientific communications to the Society (which were as often as not published in the *Philosophical Transactions)* (25). By May, 1683, he had been elected its Secretary (26). He also involved himself in the activities of the Philosophical Society of Oxford, of which he had been a principal founder, and directed its experiments while occupying a position roughly comparable to that of Hooke in the Royal Society. During the period of his Royal Society Secretaryship he made many donations to the repositories of the organizations in which he proudly served and, while adding to his own collection of minerals, he also made certain that a parallel series be made available for study at Gresham College (27). In 1683 he obtained the post of Editor of the *Philosophical Transactions*, which he held from No. 143 (1683) to No. 166 (1684) inclusive. All of these activities, of course, kept him in direct contact with many of the leading British experimentalists.

Because of the fact that Plot also jointly held the position of first 'Custos' of Elias Ashmole's new museum at Oxford and (by 1683) a Professorship in Chemistry, it is not surprising, therefore, that the pressures imposed upon him by the duties of these various other positions forced him to relinquish his Secretaryship of the Royal Society. This left him free to devote more time to setting up the Ashmolean Museum, as the new institution at Oxford came to be known, and to equipping a chemical laboratory in its basement (28).

As Professor of Chemistry, Plot prepared several works on the subject. Among these works there are plenty of examples of Plot's interest in the speculative and philosophical side of science (29). But he apparently kept up his interest in alchemy, i.e., an interest in the preparation of transcendental medicines and substances. We are told, in an article on Plot's alchemical concerns, that he had devoted much attention to 'mysterious liquors which he regarded as fundamental to transcendental medicine and alchemy', and that there is evidence that in or about 1677 he set up in partnership with others to prepare and sell 'chymical medicines'; furthermore, Plot later came across a certain secret which also involved his attempt 'to make an agreement with some [unknown] person ... whereby, in return for the knowledge of the secret ... he was to take the practical steps necessary for the preparation of the Elixir, the Alkahest, and the Grand Arcanum, and to share the proceeds with Plot' (30). So, scientist though he was, he nevertheless exhibited, as Gough explains, 'the frequent appearances of want of judgement [which] must be

ascribed in great measure to the credulous temper of the age he lived in' (31).

Throughout this period Plot acted as a major link between the two scientific societies in which he served (32). Meanwhile, in 1684, he began to visit Staffordshire (at the invitation of Walter Chetwynd of Ingestre, so it is said) with the view of preparing a natural history of that county (33). Plot began by issuing his second set of queries in 1679, but because of the burdensome workload which his employments entailed, and since the required fieldwork was not in any case an easy chore, *Staffordshire* did not appear until 1686, at about the time natural history began to flourish elsewhere as well; in 1683, for example, the *Philosophical Transactions* advertised a regional natural history of Switzerland, compiled by Jacob Wagner, which was also intended 'to promote a true Experimental Philosophy' (34). It seems that Plot's tour of Staffordshire was begun in May of 1680, and the material collected within about a year, 'about which time the book will be put to the press'. However, at one point in *Staffordshire* (page 219), in reference to some 'deterrations, or falls of the Earth', Plot mentions the current year to be 1684, thus indicating the delay in bringing the work to print (35). Like *Oxfordshire*, it contains an elaborate map of the county executed in Plot's hand. Although Plot was not by profession a mapmaker, this particular production of his merits attention because it established the model for future maps down to the latter part of the eighteenth century, going further than earlier mapmakers in using conventional signs to distinguish parishes, villages, houses, etc. Also, the relation of the county to the degrees of latitude is indicated for the first time, the fifty-third degree being drawn across the map and the margin being divided into minutes (36).

In *Staffordshire* Plot's method is the one he used in his first regional study, except that here he involves himself 'in the determination of more difficult Questions'. His first chapter, 'Of the Heavens and Air', is concerned with natural phenomena, especially with unusual displays such as rainbows, solar haloes, winterlighting, strange echoes, etc., usually with the view to rationally explaining such phenomena in non-supernatural terms. Like many of the earlier chorographers, Plot had an interest in prodigious accounts of unusual objects seen falling together with the rain (accounts transmitted by the Ancients, who are individually cited by the author). But unlike them he was quick to point out, for example, that frogs seen falling from the sky 'may be either blowne from the tops of Mountains, or drawn up with the vapours . . . and be brought to perfection in the Clouds, and discharged thence in Showers' (37). Plot was able, in other words, to separate fact from fancy, in most instances at least.

The second chapter, 'Of the Waters', embodied a systematic discourse on

the origin of springwater while utilizing particular local instances as a basis for several innovative general arguments (38). In so doing Plot asked his readers:

> Whether the Springs are supplyed with that great Expence of water, that we see they dayly vent, from Rains, Mists, Dews, Snows, Haile etc. received into the Springy tops of Mountains and sent forth again at the feet of them, or somewhere in their declivities; or whether they are furnish't from the Sea through subterraneous passages, as from the great Treasury of the waters, and are return'd again thither by the Rindles, Brooks, and Rivers? Or in short, whether they have their Origine from the Sea by a superior Circulation through the Clouds; or by an inferior, through Channels in the bowells of the Earth? or from both? (39)

Then Plot set out a detailed classification of springs (which included a discussion of 'periodical waters', such as those of certain major rivers, e.g., the Niger, Ganges, Rio de la Plata), at first presenting in a deliberate manner the (correct) theory that the ultimate source of springwater is rainfall. But as he continued, dissecting the hypotheses of other writers on this subject, his original theory was unfortunately discarded as he convinced himself that most springs depend on the sea for their supply, on the basis of an 'inferior circulation'. He nevertheless was able to support his revised viewpoint with several persuasive scientific arguments (40).

A good portion of Chapter Three is taken up with soils in relation to agriculture and the use of clays and marls (41). From a general description of agriculture Plot embarked on an investigation of the constitution of the particular soil-types, noticing the effects of denudation and deposition:

> It is also likely, if not certain, that all valleys rise by atterration i.e. by Earth continually brought down from the tops of mountains by rains and Snows, whence all Mountains are become lower than they were formerly, and the Valleys risen higher; So that in time all the Mountains (except the rocky, such as the Rockes in the Moorelands) will by great shoots of rain be quite washed away, and the whole earth levelled. . . . (42)

The condition of the roads had not apparently changed significantly since the time that the chorographers had first complained about their poor condition. Thomas Habington, for example, had described Worcester ways as singularly bad due to the character of the local soils and the flooding of the Avon. Plot, meanwhile, attributed the deteriorating state of the roads about Sedgley, Wednesbury and Dudley to the carriage of heavy loads of coal (43). The remainder of the chapter dealt with coal (44). First, Plot provided a list of the items which require consideration:

> Whereof there being great plenty of diverse kinds found here, I shall first give an account of the severall species of them. 2. of their dipping, basseting or cropping, and their Rows or Streeks, 3. of the measures or floores there are of them, their partings or Lamings, with the terms of Art for them in different places, 4. of the damps that attend them, by what means they seem to be occasioned, and how cured, 5. how the coal pits come so many of them to take fire, and 6. of their several ways of finding and working them. . . . (45)

Plot's stratigraphical account of the coal measures transcended the geological outline of Owen's or even Aubrey's work, and here we find some of the first explicit statements of certain fundamental conceptions, together with the terminology, of structural geology (46). He described the 'profundity' (thickness) of beds, their succession, and gave examples of detailed sequences with measured thicknesses at different locations, thus presenting one of the first (if not the first) tables containing the core-material of stratigraphical data. At Wednesbury, for example, he established the following divisions, with their respective depths and different denominations, for the layer of upper coal:

1. The top or roof floor, 4 foot thick.
2. The overflipper floor, 2 foot.
3. The gayfloor, 2 foot.
4. The Lam-floor, 2 foot.
5. The Kit floor, 1 foot thick.
6. The benchfloor, 2 foot and 1/2.
7. The springfloor, 1 foot.
8. The Lower flipper Floor, 2 foot and 1/2. . . . (47)

The final few pages of this section centre on the practical search for coal.

The chapter which follows, 'Of Stones', takes up a subject long inherent it seems in regional study, namely the use of lime for fertilizer. But it also contains a rather amusing anecdote concerning Plot's experiment on the variation of the compass needle. While out in the field and finding that his compass reading was wide of the mark by six degrees, Plot 'could not imagine how this should come to pass otherwise than by the Magnet, unless by some old Armour that might be buryed hereabout in the late civil War': in truth, the problem was most likely the result of the magnetic property of local deposits of magnetite, an ore which is now known to exist in abundance in Staffordshire (48).

But it is for the content of Chapter Five, 'Of Formed Stones', that Plot's book is best known. (By 'Formed Stones' Plot meant, in effect, mineral crystals

and genuine fossils.) He began with objects supposedly having some connexion with the heavens, e.g., 'selenites' and 'asteriae', working his way downwards through the 'inferior heaven' (those objects generated in the air amongst the clouds), and the waters, to the Earth below. This led him in some instances to indiscriminately disseminate descriptions of objects that obviously call for treatment as a class; but this method conforms to his handling of other topics throughout the book.

One of his most important contributions lies in the field of palaeontology, specifically in his exact descriptions and illustrations of fossils. *Oxfordshire* is notable for its excellent illustrations of fossils from the Jurassic and Cretaceous periods. Similarly, in *Staffordshire* Plot described and illustrated, for the first time, some of the more familiar shells (brachiopods) taken from the Carboniferous and Silurian limestones (49). Despite this, some of his views were of dubious value, at least as far as his central proposition regarding the origin of fossils is concerned (50). 'The great Question now so much controverted in the world' had already been established in *Oxfordshire*:

> Whether the Stones we find in the forms of Shellfish, be Lapides sui generis, naturally produced by some extraordinary plastic virtue latent in the Earth or Quarries where they are found? Or whether they rather owe their form and iguration to the shells of the Fishes they represent, brought the places where they are now found by a Deluge, Earthquake, or some other such means, and there being filled with mud, clay, and petrifying juices, have in tract of time been turned into stones, as we now find them, still retaining the same shape in the whole, with the same lineations, sutures, eminiences, cavities, orifices, points, that they had whil'st they were shells? (51)

Plot rejected the idea that the fossils 'owed their form and figure to the shells of the Fishes they represent' and took the former view, leaning 'rather to the opinion of Mr. Lister, that they are Lapides . . .', disagreeing therefore with Hooke, Ray, and with others who maintained an opposing stance (52). For Plot, fossils represented naturally-created objects produced by some extraordinary plastic virtue latent in the earth where they were found.

In *Staffordshire* he elaborated on the argument that formed stones were not the actual remains of once-living organisms:

> But as for stones found, like Sea-fish, though in this Mediterranean County, I have met with many, and of many sorts; but chiefly resembling Shell-fish of the testaceous kinds, both univalves and bivalves; and of the former of these, some not turbinated, and others again of the turbinated kind. Of the

> first sort whereof, viz. Stones representing univalves not turbinated, I had two bestowed on me by the curious Observer the Worshipful Walter Chetwynd of Ingestre Esq; so altogether unlike any of the living Shell-fish, that alone they are sufficient to convince any unprejudiced person, that all these formed stones cannot be shaped in Animal molds. (53)

Plot gave no fewer than seven reasons for adhering to this position. He first rejects rival theories of the former existence of a flood, either the deluge of Noah or else a more localized flood, that supposedly transported the shells inland. Second, he was unable to discover the kinds of shell bones which would have been, he assumed, deposited by flooding. He was only able to locate certain testaceous-like shells. Among his other arguments he also noticed that many of the formed stones appear to have been created on the spot where they were found. Robert Hooke, on the other hand, believed that formed stones included several specimens that were so similar to living shells that they could have been nothing else but the remains of animal shells. He also reasoned that nature would not have wasted her time in the useless creation of such formed stones (54). Plot could not accept either argument. He thought that there existed, in fact, many things in nature that resembled living organisms, pointing to the auriculare and cardite stones which looked like those parts of human bodies from which they derived their names. As for Hooke's other hypothesis, Plot countered that formed stones were—like flowers—created by nature to beautify the world; not to mention the fact they had medicinal properties. Furthermore, he noted that many former shells were found far inland, deposited there by different types of actions; e.g., some were thrown up on the seashores, others were remnants of shellfish eaten and discarded by town dwellers, and so on. All of these shells had been permeated by 'petrifying juices' and thus, in time, became petrified (55).

Having described the flora and fauna of Staffordshire, Plot incorporated into his work a study 'Of Men and Women'. In keeping with his love of displaying the unusual he treated the 'accidents' which have befallen mankind; first, those occurring 'at or before his birth, then in his course of life, and lastly at his death'. This entire chapter is riddled with examples of these, many of which involve persons with whom Plot had personal contact. Other examples are taken from the works of Erdeswicke, Stow, Dugdale, Wood, and others. His favourites include monstrous births, instances of long periods of somnambulism, strange distempers and diseases, etc.

The final chapter, 'Of Antiquities', is further evidence that scientific antiquarianism was now established within the context of regional study,

even if it still generally remained a secondary concern when compared to natural history. As Plot explained:

> For Satisfaction of the Reader, upon what terms I added this Chapter of Antiquities to my *Natural History*, it seeming to some altogether forraigne to the purpose: I take leave to acquaint him, before I advance any further, that I intend not to meddle with the pedigrees or descents either of families or lands, knowing a much abler pen . . .; nor of the antiquities or foundations of Religious houses, or any other pious or civil performances: it being indeed my designe in this Chapter, to omit, as much as may be, both persons and actions, and chiefly apply my self to things; and amongst these too, only of such as are very remote from the present Age, whether found under ground, or whereof there yet remain any footsteps above it; such as ancient Medalls, Ways, Laws, Pavements, Urns, Monuments of Stone, Fortifications, etc. whether of the ancient Britons, Romans, Saxons, Danes, or Normans. Which being all made and fashioned out of Natural things, may as well be brought under a Natural History as any other thing of Art: so that this seems little else but a continuation of the former Chapter [i.e., 'Of Arts']; the subject of that, being the Novel Arts exercised here in this present age; and of this, the ancient ones. . . . (56)

Plot set out his programme of scientific antiquarianism, one not significantly different from that of Aubrey, in his letter to John Fell. Plot endeavoured 'to make a full Collection of British, Roman, Saxon, and ancient Money', and also of urns, lamps, 'Lachrymatories', ancient inscriptions, ruinous buildings, hill fortifications, barrows and Roman roads (57). Hunter, however, is correct in drawing attention to Plot's tendency to rather uncritically 'interpret antiquities piecemeal by received ideas' (58). Thus, in *Oxfordshire*, Plot had already referred to such monuments as that famous stone circle located outside of Wiltshire and the Rollright stones. But he credulously repeated, at the same time, various wild claims as to their origins. In *Staffordshire* Plot described not only monuments but also portable artefacts. He described in detail serrated points and spears, discussing their origins and use. He insisted that these are all man-made, and he compared the stone tools of Britain with those from America (59). His illustrations of a stone projectile and of a spearhead are perhaps the first published British drawings of local stone artefacts. In regard to Stonehenge, Plot arrived at the conclusion that it was most likely a British forum or temple, and not one commemorating any Roman pagan deity, since the Romans were at one time skilled in architecture and, if they had been the builders, 'would have made a much more artificial structure' (60). Similarly,

he found arguments to counter claims that Stonehenge was built by the Danes.

Staffordshire crowned Plot's reputation, and a hundred years later it still could be said that in the compiling of regional natural histories 'he has not been excelled by any subsequent writer' (61). *Staffordshire* also proved to be the only book on the natural history of the county until 1844 (62). Once *Staffordshire* was completed Plot relinquished the Chair of Chemistry, entered into marriage, and retired to the life of a country gentleman on his Kentish property. Not surprisingly, he could not resist the compilation of a natural history of that county. (He also intended to do the same for London and Middlesex.) In mid-August, 1693, Plot therefore engaged in a fact-finding excursion through Kent in company with a man named Thomas Browne (63). By early September he was able to write that: 'I have now finish't all the upper part of Kent, having travell'd as near as I can guess about 200 miles, whereof I believe not much above fifty on horseback, notwithstanding the weather here has been so bad. . . .' (64). He then directed his attention to London and Middlesex, so that by November, 1694, he had 'now actually enter'd upon my great work' (65). However, the plan was to come to nought; Plot fell ill with the 'stone' and died in the spring of 1696.

That Plot's scholarship was held in high esteem is evident in the fact that a new post, that of 'Mowbray Herald Extraordinary', was created specifically for him about one year before his death, at which time he was also appointed Register to the Court of Honour. His name is also kept alive among fossils by one of the better known sea urchins, 'Clypeus plotii'. Partly thanks to Plot's two major works natural history became the dominant element in regional study, thus supporting the claim that Plot was 'one of the Oxford pioneers in the development of regional geography' (66). His influence upon regional study lasted at least half a century, by which time a great deal of interest in antiquities was being directed to the study of Classical rather than British antiquities. The ancient Britons, the Druids, and the sites and artefacts attributed to them were being romanticized by the mid eighteenth century. Also only a minority of the regional writers were involved in the serious study of natural history. Thus, it may be argued that in some respects regional had gone full circle between the mid seventeenth and mid eighteenth centuries, with the pioneering scientific researches of Plot and the other regional natural historians providing the main break between the two periods (67).

Notes

(1) Robert W. T. Gunther, *Early Science in Oxford*, 14 vols. (Oxford, 1923–45), 12 (1939): preface. Gunther says (page 333) that it was the publication of Robert Plot's *The Natural History of Oxfordshire* (Oxford, 1677) that persuaded Ashmole to donate his collections to Oxford University, and so 'To Plot . . . Oxford owes the first public Institution in Britain for the study of Natural History in its widest aspects'.

Plot's regional natural histories bore considerable resemblance to work being conducted in Ireland and on the Continent. Gerard Boate, a Dutchman, is generally given credit for the first regional natural history—of the seventeenth century—written in English which was not a translation from the Classics. Boate's *Irelands Naturall History* (London, 1652) was also the first such study to bring the Classical outlook on natural history, as personified by Pliny, to bear upon regional study in Britain. Plot was the first native Briton to fully incorporate Boate's rigidly systematic plan. For more information on this connexion see Charles Webster, *The Great Instauration: Science, Medicine and Reform 1626–1660* (New York, 1976), pp. 427–428.

(2) Robert Plot, 'Plinius Anglicus sive Angliae Historia naturalis ac Artium', London, Society of Antiquaries, Society of Antiquaries MS., 85, fol. 2.

(3) Plot, *Oxfordshire*, p. 204; Robert Plot, *The Natural History of Staffordshire* (Oxford, 1686), pp. 329–330.

(4) Plot, 'Plinius', fol. 2, quoted in Michael Hunter, *John Aubrey and the Realm of Learning* (London, 1975), p. 70.

(5) Anthony a Wood, *Athenae Oxonienses*, 2 vols. (London, 1691–92), col. 772.

(6) Francis Bacon, 'Parasceve', 2, in Francis Bacon, *The Works of Francis Bacon*, eds. James Spedding, Robert L. Ellis, and Douglas D. Heath, 14 vols. (London, 1857–74; reprinted, New York, 1968), vol. 4, p. 254.

(7) See Gunther, *Science in Oxford*, vol. 12, pp. 335–336.

(8) The letter to Fell is contained in ibid., vol. 12, pp. 343–344; Spelman's 'Villare Anglicum' is also analysed by Aubrey in Oxford, Bodleian, Aubrey MS., 5.

(9) Ibid., fol. 19.

(10) Gunther, *Science in Oxford*, vol. 12, p. 344.

(11) Plot, 'Plinius', fol. 1.

(12) 'Oxford Testimonial to Dr. Plot', 25 July 1674, in Gunther, *Science in Oxford*, vol. 12, pp. 345–346.

(13) This is especially true of Plot's *Enquiries*, published in 1679.

(14) The original manuscript of 'the Naturall History, only', for 'Surrey' (which Aubrey sent to Plot), survives as Oxford, Bodleian, Aubrey MS., 4, 235f.

(15) Plot, *Oxfordshire*, p. 99.

(16) Aubrey's copy of Plot's *Oxfordshire* is now Oxford, Bodleian, Ashmole MS., 1722. Aubrey's marginal notes here indicate the nature of his assistance to the author. On page 336, for example, we learn that Plot derived his information on certain Danish fortifications from a 'note the Dr. had fro J Aubrey'. It appears that Edward Lhuyd came to peruse this same copy; on the title page is written, in Lhuyd's hand, 'Historian Suam Naturalem agri Staffordeshire. . . .' On Aubrey's assistance to Plot also see Oxford, Bodleian, Rawlinson MSS., K15281, fols. 102–164; K15282, fols. 198–294.

(17) Robert Plot to John Aubrey, February 1676, London, BL, Egerton MS., 2231, fols. 100–101; also see Oxford, Bodleian, Aubrey MS., 13, fol. 137.

(18) Hunter, *John Aubrey*, pp. 83, 86. Of Plot, Aubrey had this to say 'I did not think that there had been so much trueth in Mr. R. Sheldon's advice to [me] sc: lend not your MSS. how ungratefully Dr Plott hath used me!' (Oxford, Bodleian, Aubrey MS., TGC25, fol. 95).

(19) An excellent, though brief, article on the scientific nature of the regional work of Plot and that of several other investigators is F. V. Emery, 'English Regional Studies from Aubrey to Defoe', *Geographical Journal*, **124** (1958), 315–325, from which much of the information on Plot's method of dividing the area under study is derived. Additional information on Plot is found in Michael Hunter's *Science and Society in Restoration England* (Cambridge, 1981); Barbara J. Shapiro, *Probability and Certainty in Seventeenth-Century England* (Princeton, 1983): Roy Porter, *The Making of Geology* (Cambridge, 1977): Michael Pafford's brief 'Robert Plot: a County Historian', *History Today*, **20** (1970, 112–117; and M. W. Greenslade, *The Staffordshire Historians* (Fenton, Stoke-on-Trent, 1982).

(20) Plot, *Oxfordshire*, 'To the Reader'.

(21) Ibid., p. 69.

(22) Ibid., 'To the Reader'; all of the references to the map, which follow immediately, are taken from here.

(23) It is amusing that although Plot was generally considered both a man of learning and a man of affairs, some of the Staffordshire gentry to whom he addressed his enquiries used to boast of having 'befooled old Plot'. To such displays, in the last sentence of *Staffordshire* Plot replied: 'I hope all Readers will deale so candidly with me, as only to reprove me calmly, for what is done amiss, which sort of Chastisement I shall cheerfully receive; sincerely promising never to offend in the like manner again. . . .' Further to this, the publisher of the second edition of *Oxfordshire*, in his remarks to the reader, states that the objections that have been raised against some of Plot's hypotheses have no other foundation than ill nature and censoriousness.

(24) Ibid., pp.1–2.

(25) He appeared in the *Philosophical Transactions* as the author of commentaries on such topics as the formation of sand and salt from brine, sepulchral lamps, observations on lead, and on electrical bodies.

(26) When the Duke of York visited Oxford with Princess Anne in the spring of 1683, Plot's *Oxfordshire* was presented to him as a gift, together with Wood's history of the university. Plot also had the honour of entertaining the Royal party by performing chemical experiments for their satisfaction.

(27) Gunther, *Science in Oxford*, vol. 12: p. 349, contains a list, compiled from Birch's historical notes, of gifts made by Plot in 1683. These included the following examples:

Jan. 31. 1. Moyra, an earth, wherewith the Turks paint their . . . walls of their houses

2. A depilatory, 2/3 lime, and 1/3 orpiment, made in a cataplasm, to take away hair.

Feb. 21. 13. A white earth for polishing silver.

17. An earth found under Fairy-rings.

June 6. 32. A piece of rock crystal from Madagascar.

June 27. 35. Selenites dodecahedros, mentioned in . . . *Natural History of Oxfordshire.*

(28) That the new institution, as Gunther, *Science in Oxford,* vol. 12: p. 353, points out, was not as widely known in Oxford as it deserves to be is revealed in the following letter (Edward Lhuyd to John Aubrey, 12 February 1686, London, BL, Egerton MS., 2231, fol. 228):

'Twas well you writ to me of it, for the generality of people at Oxford doe not yet know what ye Museum is: for they call ye whole Buylding ye Labradory or Knaecatory and distinguish no farther. That nothing miscarried soe directed to Dr. Plot, was because ye Person was known better than ye place, but things directed to me or Mr. Higgins commonly stayd at the carriers till we fetch'd them.

As for the benefactor, Ashmole, his story is told by A. L. Humphreys, *Elias Ashmole* (Reading, 1925). Ashmole's notes on Berkshire were carelessly assembled and printed by E. Churll (see ibid., 17–18) under Ashmole's name as *The Antiquities of Berkshire*, 3 vols. (London, 1719). Also see C. H. Josten, *Elias Ashmole* (1617–1692), 5 vols (Oxford 1966) for the Plot–Ashmole connexion.

(29) See Gunther. *Science in Oxford,* vol. 12: pp. 355–356; for Plot's overall work in chemistry see ibid., vol. 1 (1923): pp. 47–50, 251–261.

(30) F. Sherwood Taylor, 'Alchemical Papers of Dr. Robert Plot', *Ambix* **4** (1949), 69–70. Taylor based his article on the evidence of a volume containing a number of Plot's papers, now London, BL, Sloane MS., 3646.

(31) Richard Gough, *British Topography*, 2 vols. (London, 1780), vol. 1: p. xix.

(32) Martin Lister extended his wishes to Plot for the success of the newly-established Philosophical Society of Oxford, stating that 'Your new Societie will be of great use, it will excite this other here, and emulation is the great promoter of learning'; he went on to observe that 'your Methode to be more free and more intent than ours; and I hope you will put us upon new wayes, as well as new matter of Experiments' (Martin Lister to Robert Plot, October 1683, Gunther, *Science in Oxford,* vol. 12: p. 39).

(33) The *Dictionary of National Biography* credits Chetwynd; but Plot, in *Staffordshire,* p. 61, refers to the 'Right Honourable the Virtuous and most Accomplish't Lady, Jane Lady Gerard Baroness Gerard of Gerrards Bromley, *the first actual Encourager of this Design'.* (Italics mine). Chetwynd was a distinguished antiquary, elected to the Royal Society in 1678. Among his collections we find the papers of William Burton. He was, apparently, a generous man; not only did he finance the building of a church at Ingestre (see Plot, *Staffordshire,* pp. 297–300), but he also acted as a patron to Plot, aiding him financially in the survey of the county. He also assisted Plot by supplying useful answers to Plot's queries; see Gunther, *Science in Oxford*, vol. 12: p. 218.

(34) Jacob Wagner, 'Historia Naturalis Helvetiae Curiosa', *Philosophical Transactions* **13** (1683): 268–271. Wagner's study is organized along the same general lines as those of Plot or Aubrey, taking into account the great difference in the topography of the respective regions under consideration. Also see Francis Aston to Robert Plot, 12 July 1683, Gunther, *Science in Oxford,* vol. 12: p. 36.

(35) See S. A. H. Burne, 'Early Staffordshire Maps', *Transactions of the North Staffordshire Field Club* **54** (1920): 70. At least one of Plot's correspondents, Charles King, apparently was confident that Plot's second regional natural history 'would be publick' well before the time that it actually was; see Charles King to Robert Plot, 26 March 1684, Gunther, *Science in Oxford,* vol. 12: p. 216.

(36) All of these innovations are discussed in Burne, 'Staffordshire Maps', p. 69.

(37) Plot, *Staffordshire,* pp. 23–24.

(38) He does the same thing in *Oxfordshire,* where he uses the description of fossils found there as a starting point for a discussion of the origin of fossils in general. He does not, however, in this particular case repeat the origin theory again in *Staffordshire* because of his profound desire to 'avoid all vain repetitions' (page 2).

(39) Ibid., p. 50.

(40) At one point (ibid., p. 60) Plot alluded to Boate's study of the springs of Ireland, which was contained in *Irelands Naturall History,* chap. 7. Plot, in another work, *De Origine Fontium, Tentamen Philosophicum* (Oxford, 1685), p. 7, discussed in greater detail the explanations of the relationship between seawater and springwater as subscribed to by various other figures, including Vitruvius, Peter Martyr, Cardano, Molina, Palissy, Gassendi and Hooke. These generally attributed to Aristotle the hypothesis of the exchange of water between the oceans and the atmosphere. The theory postulating the subterranean origin of springs they credited to Plato.

(41) See Emery, 'Aubrey to Defoe', p. 319, for more on Plot's division of the county into three soil types.

(42) Plot, *Staffordshire,* p. 113; also see his discourse on soil erosion (page 170).

(43) See W. H. B. Court, *The Rise of the Midland Industries, 1600–1838,* 2d. ed. (London, 1953), pp. 16, 164. Plot, *Staffordshire,* p. 110, states that the mountains of the northern part of the county are 'hardly passable, some of them being of so vast a height, that in rainy weather I have frequently seen the tops of them above the Clouds'.

(44) This comes only after Plot concluded his section on the soil by stating (ibid., p. 125) that: 'reckon'd up by such as have written de Arte combinatoria' there are in total '179,001,060 different sorts of Earths'.

(45) Ibid.

(46) Plot was the first to use the following geological terms: 'bass', 'basset', 'bats', 'clunch', 'laming', and 'measure'. D. R. Dean, in 'The Word "Geology,"' *Annals of Science* **36** (1979): 35, states that: 'The earliest direct ancestor of our present word "geology" is the "geologism" of Richard de Bury, which appears as a deliberate coinage in Chapter II of his *Philobiblon* (written 1344)'. The term is here used to denote 'earthly science' in the sense of human laws as contrasted with Divine ones. 'The first British work to acknowledge an independently designated science of the earth obviously akin to geology', according to Dean (ibid., p. 36), was Daniel Collins's translation of Mickel Pederson Escholt's *Geologica Norvegica* (1657). Plot apparently was aware of Collins's translation, for he cited it (incorrectly) in *Staffordshire,* p. 145. The first book written by an English-speaking person to carry the title 'Geologia' was a cautious criticism of Burnet's *Telluris theoria Sacra,* by Erasmus Warren,

Geologia, or a Discourse . . . Wherein the Form and Properties Ascribed to It [the earth], in a Book Intituled, 'The Theory of the Earth', Are Excepted Against (London, 1690).

(47) Plot, *Staffordshire*, p. 131.

(48) Ibid., p. 170. On the magnetic polarity and the compass, also see Francis Aston to William Musgrave, 24 January 1683, in Gunther, *Science in Oxford*, vol. 12, pp. 50–51.

(49) L. R. Cox, 'British Palaeontology: A Retrospect and Survey', *Proceedings of the Geologists' Association*, **67** (1956), 210–211.

(50) H. Hamshaw Thomas, 'The Rise of Geology and Its Influence on Comtemporary Thought', *Annals of Science*, **5** (1947), 327, believes that Plot was '. . . one of the last champions of the old views in England'.

(51) Plot, *Oxfordshire*, p. 111; also see another excellent study, Sir Archibald Geikie, *The Founders of Geology*, 2nd. ed. (New York, 1905), p. 77. The close ties between British naturalists investigating their native land and those studying other lands is revealed, for example, by the fact that—in connexion with the examination of fossil remains—Plot credits his 'Ingenious friend', John Banister, M.A., with finding near Oxford an 'Anthropocadites' which he illustrates on Plate VIII, fig. 2 of *Oxfordshire*, commenting that: 'I thought its Admittance would be not ungrateful to the reader'; Banister consulted Plot's works for information on various matters.

(52) Plot, *Oxfordshire*, pp. 111–112.

(53) *Staffordshire*, p. 182.

(54) *Oxfordshire*, pp. 118, 120.

(55) Plot's 'petrifying juices' or 'plastic force' was certainly what we now recognize as crystallization, and the workings of the salt principle in the creative plastic virtue were described by Plot in great detail in ibid., pp. 121–124. There were certain fossils whose organic nature Plot was prepared to admit, for they possessed not only the outward form of bones but exhibited, though turned to stone, a characteristic bony structure.

(56) Plot, *Staffordshire*, p. 392.

(57) Robert Plot to John Fell, n.d. (c. 1673), Gunther, *Science in Oxford*, vol. 12, pp. 341–342.

(58) Hunter, *John Aubrey*, p. 202.

(59) Plot, *Staffordshire*, pp. 396–397. Plot described flints that were 'exactly in the form of a bearded arrow jagged at each side with a large stem in the middle'. He concluded therefore that 'not only are these arrows . . . all artificial, whatever is pretended, but also that they had anciently some ways of working by the tools, which may be seen from the marks'; ibid., p. 396. Olao Wormius, in *Museum Wormianum* (Leyden, 1655), chap. 3, p. 39, had already written that: 'some [of these flints] resemble so closely the point of a sword that it is doubtful if they are the work of nature or of art. . . .'; see Philip Shorr, 'Genesis of Prehistorical Research', *Isis*, **23** (1935), 429.

(60) Plot, *Staffordshire*, p. 398.

(61) R. Pulteney, *Historical and Biographical Sketches of the Progress of Botany in England*, 2 vols. (London, 1790), vol. 1, p. 351.

(62) R. Garner, *The Natural History of the County of Stafford* (London, 1844–60), was the first to follow in Plot's footsteps.

(63) An account of the antiquities which Plot and Browne examined is contained in a small diary entitled 'Tour in Kent', London, BL, Sloane MS., 1899, and also Oxford, Bodleian, Rawlinson MS., D390, fols. 95–96; see Gunther, *Science in Oxford,* vol. 12, p. 360.

(64) Robert Plot to Arthur Charlet, 2 September 1693, ibid., vol. 12, p. 396.

(65) Robert Plot to Arthur Charlet, 1 November 1694, ibid., vol. 12, p. 402.

(66) E. W. Gilbert, *Geography as a Humane Study* (Oxford, 1955), p. 4.

(67) It should be noted that chorographical studies continued to be published during the period under investigation in this article, but their significance to the field of regional study as a whole was greatly diminished due to the scientific researches of the regional natural historians. A large segment of the educated public was careful to discriminate between the two types. David Elliston Allen's statement, in *The Naturalist in Britain* (London, 1976), pp. 17–18, that 'scientific genius tends to display itself in sudden, brief bursts of magnificent intensity followed by long periods of comparative darkness', is applicable to the particular context of the history of British regional study.